

What is claimed is:

1. (amended) A transfer mechanism for transferring an object to be processed, comprising:

5 a casing for defining a transfer chamber under a vacuum state, the casing having a transfer port for transferring the object between the transfer chamber and an outside thereof;

10 a guide rail substantially horizontally installed in the transfer chamber;

a moving part including a moving body movably installed on the guide rail and a holding body for holding the object;

15 a horizontally driving unit for moving the moving body of the moving part along the guide rail;

a position detecting linear scale installed on the moving part and extending in a moving direction of the moving part; and

20 a plurality of position detecting sensors installed at a height corresponding to the linear scale on an inner surface of the casing, the position detecting sensors being disposed in the moving direction of the moving part such that a distance between two neighboring position detecting sensors is shorter than a length of the linear scale.

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2. (amended) The transfer mechanism of claim 1, wherein the moving part further includes a supporting member for vertically movably connecting the holding body to the moving body, and

5 the transfer mechanism further includes an elevation mechanism for raising and lowering the supporting member with respect to the moving body.

3. (amended) The transfer mechanism of claim 2, wherein  
10 a horizontally transferring unit for moving the object only in a horizontal direction through the transfer port is installed in the outside of the casing; and

the elevation mechanism performs a positioning of the object held in the holding body to a height corresponding to  
15 the horizontally transferring unit.

4. (amended) The transfer mechanism of claim 2, wherein the moving body includes a stopper for restricting the lowest position of the supporting member and moves while the  
20 supporting member is at the lowest position thereof.

5. (amended) The transfer mechanism of claim 2, wherein the elevation mechanism includes:

a push rod extending through a bottom portion of the casing and making a contact with the supporting member;  
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a vertically driving unit disposed in the outside of

the casing, for raising and lowering the push rod; and

a sealing unit for airtightly sealing a gap between the push rod and the casing.

5     6.     The transfer mechanism of claim 1, wherein the horizontally driving unit is a linear motor mechanism including armature coils installed in the casing along the moving direction of the moving body and a field magnet installed on the moving body; and

10         a separation wall for airtightly separating the armature coil from the inside of the transfer chamber is installed in the casing.

7.     The transfer mechanism of claim 1, further comprising  
15     a magnetic levitation device for levitating the moving body from the guide rail.

8.     The transfer mechanism of claim 1, further comprising  
20     a gas jetting levitation device for levitating the moving body from the guide rail.

9. (amended) The transfer mechanism of claim 2, wherein a partition wall for dividing the transfer chamber into an upper portion and a lower portion is installed in the  
25     casing;

the holding body of the moving part is disposed in the

upper portion of the transfer chamber while the moving body of the moving part is disposed in the lower portion of the transfer chamber;

the partition wall has a slit for allowing the supporting member of the moving part to move therethrough;  
5 and

the transfer mechanism further includes:

a gas supplying system for supplying an inactive gas to the upper portion of the transfer chamber, and

10 a gas exhausting system for evacuating the gas from the lower portion of the transfer chamber.

10. (amended) A transfer mechanism for transferring an object to be processed, comprising:

15 a casing for defining a transfer chamber under a vacuum state, the casing having a transfer port for transferring the object between the transfer chamber and an outside thereof;

20 a guide rail substantially horizontally installed in the transfer chamber;

a moving body movably installed on the guide rail;

a horizontally driving unit for moving the moving body along the guide rail;

25 an elevation supporting structure including a holding body for holding the object and a supporting member for vertically movably connecting the holding body to the moving

body; and

an elevation mechanism for raising and lowering the supporting member of the elevation supporting structure with respect to the moving body.

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11. A processing system comprising:

(a) a main transfer mechanism including:

a casing for defining a main transfer mechanism under a vacuum state, the casing having a plurality of transfer  
10 ports;

a guide rail substantially horizontally installed in the transfer chamber;

a moving body movably installed on the guide rail;

a horizontally driving unit for moving the moving body  
15 along the guide rail;

an elevation supporting structure having a holding body for holding an object to be processed and a supporting member for vertically movably connecting the holding body to the moving body; and

20 an elevation mechanism for raising and lowering the supporting member of the elevation supporting structure with respect to the moving body;

(b) an auxiliary transfer mechanism including a casing for defining an auxiliary transfer chamber under a vacuum  
25 state which selectively communicates with the main transfer chamber; and an auxiliary transfer unit installed in the

auxiliary transfer chamber;

(c) a load-lock mechanism including a casing for defining a load-lock chamber which selectively communicates with the auxiliary transfer chamber and is selectively evacuated;

(d) an entrance transfer mechanism including a casing for defining an entrance transfer chamber under an atmospheric state which selectively communicates with the load-lock chamber; and an entrance transfer unit installed in the entrance transfer chamber;

(e) a cassette station connected to the entrance transfer chamber, for mounting therein a cassette container which accommodates a plurality of objects to be processed.

(f) a plurality of individual transfer mechanisms installed to correspond to the respective transfer ports of the main transfer mechanism, each of the individual transfer mechanisms including a casing for defining an individual transfer chamber under a vacuum state which selectively communicates with the main transfer chamber via the corresponding transfer port; and an individual transfer unit installed in the individual transfer chamber; and

(g) a plurality of processing apparatuses installed to correspond to the respective individual transfer mechanisms, each of the processing apparatuses including a casing for defining a vacuum processing chamber which selectively communicates with the corresponding individual transfer

chamber, and performing a predetermined process on the object therein.

12. The processing system of claim 11, wherein the casing  
5 of the main transfer mechanism includes at least one of a plurality of casing segments connectable with each other, each of the casing segments having at least one of the transfer ports; and

the guide rail includes at least one of a plurality of  
10 guide rail segments connectable with each other.

13. (new) A processing system comprising:

(a) a main transfer mechanism including:

a casing for defining a main transfer mechanism under  
15 a vacuum state, the casing having a plurality of transfer ports;

a guide rail substantially horizontally installed in the transfer chamber;

a moving part having a moving body movably installed  
20 on the guide rail and a holding body for holding an object to be processed;

a horizontally driving unit for moving the moving body of the moving part along the guide rail; and

a plurality of position detecting sensors for  
25 detecting the position of the moving part, the position detecting sensors being disposed in the casing in a moving

direction of the moving part such that neighboring position detecting sensors are spaced from each other;

5 (b) an auxiliary transfer mechanism including a casing for defining an auxiliary transfer chamber under a vacuum state which selectively communicates with the main transfer chamber; and an auxiliary transfer unit installed in the auxiliary transfer chamber;

10 (c) a load-lock mechanism including a casing for defining a load-lock chamber which selectively communicates with the auxiliary transfer chamber and is selectively evacuated;

15 (d) an entrance transfer mechanism including a casing for defining an entrance transfer chamber under an atmospheric state which selectively communicates with the load-lock chamber; and an entrance transfer unit installed in the entrance transfer chamber;

(e) a cassette station connected to the entrance transfer chamber, for mounting therein a cassette container which accommodates a plurality of objects to be processed.

20 (f) a plurality of individual transfer mechanisms installed to correspond to the respective transfer ports of the main transfer mechanism, each of the individual transfer mechanisms including a casing for defining an individual transfer chamber under a vacuum state which selectively  
25 communicates with the main transfer chamber via the corresponding transfer port; and an individual transfer unit



installed in the individual transfer chamber; and

(g) a plurality of processing apparatuses installed to correspond to the respective individual transfer mechanisms, each of the processing apparatuses including a casing for defining a vacuum processing chamber which selectively communicates with the corresponding individual transfer chamber, and performing a predetermined process on the object therein.

10 14. (new) A transfer mechanism for transferring an object to be processed, comprising:

15 a casing for defining a transfer chamber under a vacuum state, the casing having a transfer port for transferring the object between the transfer chamber and an outside thereof;

a guide rail substantially horizontally installed in the transfer chamber;

20 a moving part including a moving body movably installed on the guide rail and a holding body for holding the object;

a horizontally driving unit for moving the moving body of the moving part along the guide rail; and

25 a plurality of position detecting sensors for detecting the position of the moving part, the position detecting sensors being disposed in the casing in a moving direction of the moving part such that neighboring position

detecting sensors are spaced from each other.

15. (new) The transfer mechanism of claim 14, wherein the moving part further includes a supporting member for  
5 vertically movably connecting the holding body to the moving body, and

the transfer mechanism further includes an elevation mechanism for raising and lowering the supporting member with respect to the moving body.

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16. (new) The transfer mechanism of claim 15, wherein a horizontally transferring unit for moving the object only in a horizontal direction through the transfer port is installed in the outside of the casing; and

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the elevation mechanism performs a positioning of the object held in the holding body to a height corresponding to the horizontally transferring unit.

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17. (new) The transfer mechanism of claim 15, wherein the moving body includes a stopper for restricting the lowest position of the supporting member and moves while the supporting member is at the lowest position thereof.

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18. (new) The transfer mechanism of claim 15, wherein the elevation mechanism includes:

a push rod extending through a bottom portion of the

casing and making a contact with the supporting member;

a vertically driving unit disposed in the outside of the casing, for raising and lowering the push rod; and

a sealing unit for airtightly sealing a gap between  
5 the push rod and the casing.

19. (new) The transfer mechanism of claim 15, further comprising:

a position detecting linear scale installed on at  
10 least one of the moving body, the holding body and the supporting member and extending in the moving direction of the moving body; and

a plurality of position detecting sensors installed at a height corresponding to the linear scale on an inner  
15 surface of the casing, the position detecting sensors being disposed in the moving direction of the moving body such that a distance between two neighboring position detecting sensors is shorter than a length of the linear scale.

20 20. (new) The transfer mechanism of claim 14, wherein the horizontally driving unit is a linear motor mechanism including armature coils installed in the casing along the moving direction of the moving body and a field magnet installed on the moving body; and

25 a separation wall for airtightly separating the armature coil from the inside of the transfer chamber is

installed in the casing.

21. (new) The transfer mechanism 14, further comprising a magnetic levitation device for levitating the moving body  
5 from the guide rail.

22. (new) The transfer mechanism of claim 14, further comprising a gas jetting levitation device for levitating the moving body from the guide rail.  
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23. (new) The transfer mechanism of claim 15, wherein a partition wall for dividing the transfer chamber into an upper portion and a lower portion is installed in the casing;  
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the holding body of the moving part is disposed in the upper portion of the transfer chamber while the moving body of the moving part is disposed in the lower portion of the transfer chamber;  
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the partition wall has a slit for allowing the supporting member of the moving part to move therethrough;  
and

the transfer mechanism further includes:

a gas supplying system for supplying an inactive gas to the upper portion of the transfer chamber, and

25 a gas exhausting system for evacuating the gas from the lower portion of the transfer chamber.